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B7D  
Selected US specifications from IPC sub-class B60G

(54) Improvements in air suspensions  
for vehicles

(57) A semi-trailer or trailer road vehicle has an axle (18) controlled by an air spring bellows unit (24). An upper bump stop (30) controlled by actuator (38) may be moved from an inoperative position to a working position where it is interposed between a lower bump stop (28) and a longitudinal beam (10) of the vehicle sub-frame, thereby eliminating most of the suspension movement and preventing undesirable settling of the vehicle when uncoupled and parked.

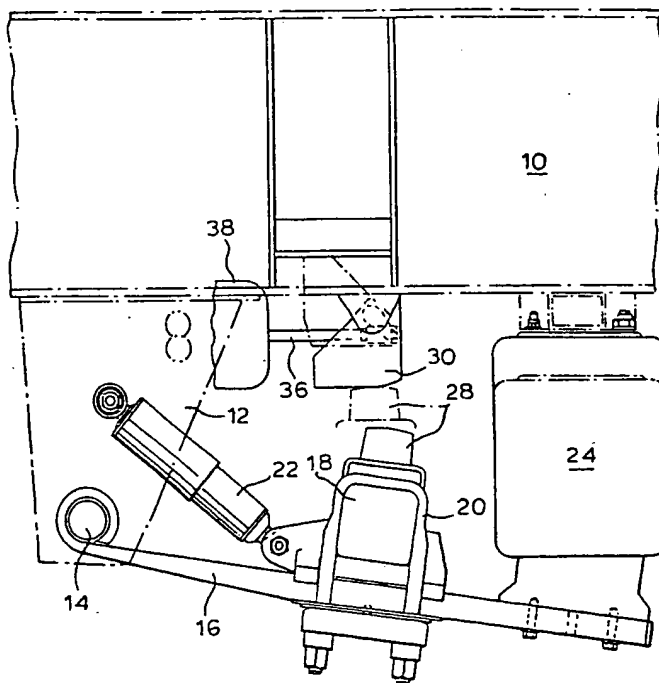


FIG. 1.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.  
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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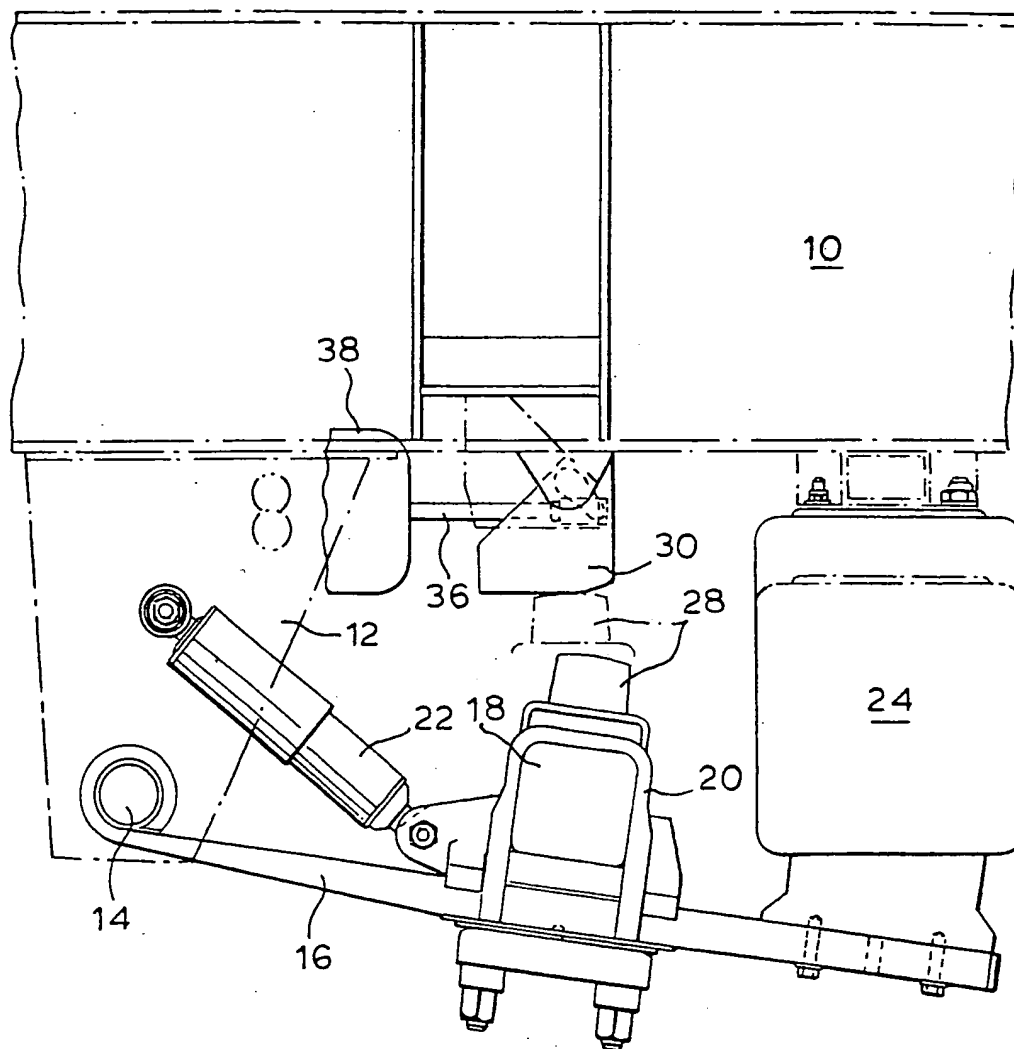


FIG. 1.

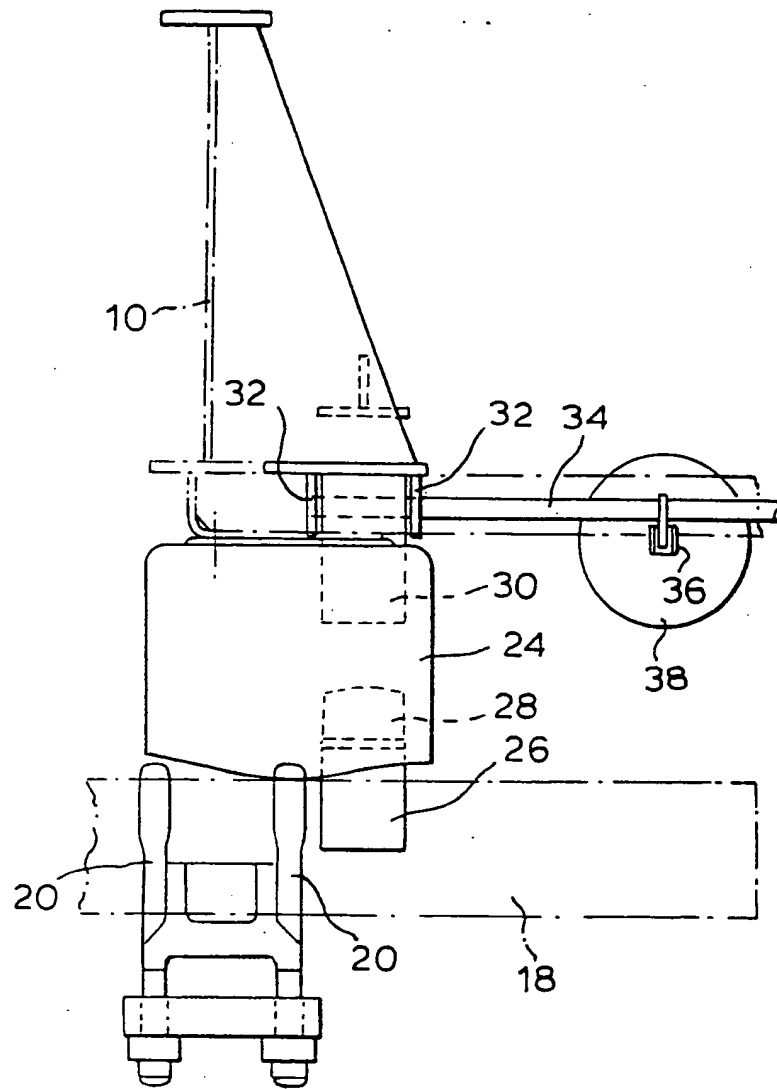


FIG. 2

## SPECIFICATION

## Improvements in air suspensions for vehicles

- 5 This invention relates to an air suspension for a trailer or semi-trailer road vehicle and to a vehicle fitted with such suspension.

Certain vehicles, particularly trailers and semi-trailers, fitted with air suspensions settle when uncoupled from the tractor unit/towing vehicle and parked. Under some conditions this settling may be a hazard. For example, when the trailer/semi-trailer is parked in a loading bay, settling during load can cause unacceptable variations in deck height.

- 10 Settling of the suspension can also cause the vehicle to move forwards, increasing the dimension between the suspension and landing legs and causing damage or collapse of the landing legs.

According to the invention this problem can be solved by providing bump stop means operable between working and inoperative states and acting between a frame member of the vehicle and a moving element of the suspension to limit suspension movement when in its working state to prevent settling of the vehicle which has a suspension fitted with a gaseous or fluid springing medium.

The adjustable bump stop may be brought into action by any or combinations of the following

- 30 actions:

Operation of a manual control;  
Disconnection of a trailer's air or electrical connectors;

Operation of a vehicle's parking brake control.

- 35 The adjustable bump stop eliminates most or all of the vehicle's suspension movement, when stationary, by swinging down between or movement into the space between the vehicle's bodywork or frame and its axles and/or suspension components.

- 40 An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

*Figure 1* is a side view of an air suspension fitted to a main beam of a road vehicle; and

- 45 *Figure 2* is an end view of the suspension.

In the drawings, a sub-frame longitudinal beam 10 carries a hanger bracket 12 that locates at pivot 14 the front end of a leaf spring 16. An axle 18 is held to the spring 16 by U-bolts 20 and a damper 22 is pivoted between the axle 18 and the hanger bracket 12. An air spring bellows unit 24 is fitted between the beam 10 and the trailing end of the spring 16.

The axle 18 carries a support 26 for a lower bump stop 28 of hard rubber or other suitable material. An upper bump stop 30 is carried in brackets 32 on a cross-link 34 which is movable by operating rod 36 of air actuator 38 so that the upper bump stop 30 either registers with or is removed from the lower bump stop 28. When the upper bump stop 30 is in position, the travel of spring 16 is limited, which facilitates vehicle loading and unloading as described above.

## CLAIMS

- 65 1. A road vehicle having a suspension operated

by a gaseous or fluid springing medium and bump stop means movable between working and inoperative states and when in its operative state acting between a frame member of the vehicle and a moving element of the suspension to prevent settling of the vehicle.

2. A vehicle according to Claim 1, wherein the bump stop means is movable between working and inoperative states in response to operation of

75 manual control means, or in response to disconnection of a trailer's air or electrical connectors, or in response to a parking brake control of the vehicle.

3. A trailer or semi-trailer road vehicle according to Claim 1 or 2.

4. A road vehicle substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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